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ABSTRACT

The application of behavior modification procedures by Head Start teachers in the classroom and the remedial application of programmed instructions to children with preacademic deficiencies were studied in 11 classrooms located in three Kansas towns--Lawrence, Topeka, and Kansas City. Data were collected throughout the 1968-1969 year on both the children and the head teacher. All children were pre- and post-tested on the Social Interaction Observation measure. One observer was assigned to each class. Four classes served as controls; one class received the remedial application of programed instruction; two classes had behavior modification procedures applied; and four classes were given both procedures. Seven children with special behavior problems were chosen by teachers in the behavior modification classes for study. Meetings were held once a week among the teacher, observers, and the Intervention Coordinator to discuss the progress of the child. Each individual study is described in detail, with six being successful in outcome. It is concluded that behavior modification can be effectively applied in Head Start classrooms. Teachers were able to increase verbal behavior, peer interaction, and duration in activities by applying the simple procedures of "priming" and "social reinforcement." Teachers were trained to use behavior modification principles effectively. Tables and figures provide the statistical data and samples of forms used. (DB)

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The University of Kansas Head Start Evaluation and Research Center Intervention program has focused on the application of behavior modification procedure by Head Start teachers in the classroom and the remedial application of programmed instructions to children with preacademic deficiencies. The purpose of this study was not only to look at the direct results and possibility of using behavior modification in Head Start classroom, but also the peripheral effect which would result from the teachers experience with behavior modification. Data was collected throughout the year on all the children in each classroom and the head teacher behaviors to evaluate if there were any effects on classroom behavior. The program instruction was also viewed as having more than immediate results. Not only the specific task, but instructional control were trained. Eleven classrooms were selected. They also received the evaluation phase. Four were control classes in which no manipulation was carried out. One class only received the remedial application of programmed instruction. Two classes had behavior modification procedures applied. Four classrooms were given both procedures.

In all classes observational data was collected on both the children and the head teacher. Also all the children were pretested on the preacademic task. The Social Interaction Observation was the measure used in evaluating the children's social behavior. Observation was taken during free play period. During the intervention phase in all but three classes observation of the child was discontinued.

Observation data was also collected on the head teacher. A more detailed description of the procedure and observation will be included in this report later. Also the description of the preacademic testing will be in a later section of the report.

The eleven classrooms were located in three towns, Lawrence, Topeka, and Kansas City, Kansas. Center numbers one through four were located in Kansas City. Center five in Lawrence and Centers six and seven in Topeka. In each of the four centers in Kansas City there were two classes. In centers one and four the teachers were the same with classes being morning and afternoon. Centers two and three involved classes which were combined into one large class, therefore, all the children interacted with each other and all of the teachers.

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TABLE 1

Center - Class	Intervention Condition
01 - 1	Behavior Modification
01 - 2	Behavior Modification and Preacademic Training
02 - 1	Control
02 - 2	Control
03 - 1	Behavior Modification and Preacademic Training
03 - 2	Behavior Modification and Preacademic Training
04 - 1	Behavior Modification
04 - 2	Preacademic Training
05 - 1	Behavior Modification and Preacademic Training

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06	- 1	Control
07	- 1	Control

One observer was assigned to each class. It was this person's responsibility to collect observational data on both the teacher and the children. In the classes where behavior modification was attempted these observers were responsible for recording the data on the selected child. During the pre observation there were ten observers with one observer observing in a combined classroom. During the post observation there were eleven observers for each class. These observers were undergraduates or spouses of students. They were paid on an hourly basis, part-time. Each observer was trained on the Social Inventory Observation. Before any data was collected each observer had to obtain a reliability criterion. Reliability was measured by having experienced observer and our naive observer both collect data on the same children. They would stand next to each other and begin at the precise same second. No communication was allowed between observers except to indicate the beginning and the ending of observation. The reliability criterion was an eighty percent or better agreement on total blocks and sixty percent or better agreement on total responses. A reliability check was also taken before the post-testing began.

During the first part of February teachers in the behavior modification had a meeting with the Intervention Coordinator and the classroom observer. At this meeting the teachers talked about children who they felt had special problems. Different approaches to these problems were discussed. The teachers with the help of the intervention coordinator selected a child for study. The specific behavior which was to be observed was also determined by the teachers. After a week or so of observation a second meeting was held with the teachers at this time to look at the data collected and more specifically discuss what to do. It was during these meetings that the principle and procedure of behavior modification was discussed. The meeting between the teachers, observers and the Intervention Coordinator was held approximately once a week to discuss the progress of the child.

Each individual study will be described in detail. All subjects have been given a letter to identify them. There were seven studies carried on during the intervention phase.

The subject of our study was a four-year-old Negro boy who was enrolled in a Head Start class. This classroom was in a property area in Kansas City. The area was racially mixed. The teachers described the child as not following direction, wandered from play area to play area, and never playing with toys over a few seconds. S_A had been one of the slower children in the class in preacademic skills and was one of the children they had specifically concentrated on working with.

At the first conference with the teacher at which time the experimenter, teacher, and assistant teacher met and chose this child for study. The two behaviors that were to be observed were following direction and duration in activities.

Categories and Symbols

C = Command - The teacher asking S_A to perform a specific response. The response must be one that can be seen by the observer, such as, take this board, set down, stop shouting.

+ = Responding positively to command - S_A must fulfil the command of the teacher.

- = Responding negatively to command - S_A continues to do the act that the teacher had requested stopped or the subject does something contrary to the teacher's command.

0 = Teacher initiations to S - Each initiation by teacher other than commands were recorded.

– = Activity - This was recorded by naming the precise piece of equipment used by S_A. The name of the equipment was placed over the first ten-second interval in which it was used. After the first ten-second interval in which S_A was involved in an activity if the same activity continued then a dash (-) was recorded as the symbol for continuing activity.

An activity was scored when S_A actually manipulated a piece of equipment. Passive holding was not counted, for example, just sitting on a tricycle was not counted but peddling it would be scored.

The duration of an activity was calculated by totaling the number of consecutive ten-second intervals. If there was a ten-second interval in which there was no activity then the next activity was counted as a new activity. This was recorded as new even though it involved material which had been used in the last recorded ten-second interval. The duration of activities was determined by divinding the number of activities into the number of intervals in which the subject was in any activity. Multiplying this by ten yielded the mean seconds of duration in activities.

$$\frac{\text{\# of intervals in activity}}{\text{\# of activity}} \times 10 = \text{mean seconds of duration in activities.}$$

Design

On day one through six an observer recorded the S's behavior, after the sixth day a meeting was held with the teacher. The data collected showed that the S followed a high number of commands that the teachers made. Duration of activity was extremely short. The head teacher at this time decided that duration in activity would be the behavior to work with.

On day seven the teachers were instructed to systematically socially reinforce S_A for being in an activity for more than thirty seconds. When the S had been in activity for thirty seconds the observer signaled the teacher by clicking a large clicker. If the teacher did not respond to the clicker, the observer was to click until she did. After the teacher responded once to the clicker it was not

clicked again unless twenty seconds again passed in which S_A remained in the activity without a teacher attending to him.

After day eleven a meeting was held with the staff and the teacher stated that it was impossible to hear the clicker. The observer also stated that the teacher was not attending to S_A until after he stopped the activity. The data also showed that the teachers were not attending at the appropriate time. The signal was changed from a clicker to a visual sign of the observer holding up her pencil. The teacher was reminded to be aware of the observer when the S was in their area. This method of signalling the teacher was carried out from day twelve to day twenty.

Reliability

A reliability check was made on day six and seven. Two observers (main observer #20 and reliability observer #22) took data on S_A's behavior. The reliability score was calculated by comparing each ten-second interval on both observer's data sheet. It was marked whether the observer agreed or disagreed that a behavior did or did not occur for each interval. The number of agreement were then divided by the number of agreements plus the number of disagreements, multiplied by one hundred to obtain a reliability percentage.

Observation Procedures

An observer observed and recorded the S's behavior for thirty to sixty minutes of nursery school free play sessions for five days a week. During the session the observer followed the S always staying in close proximity to him. The observer carried a clip board with a data sheet and an attached stopwatch.

A ten-second time sampling method was used. A sample of recording form is shown in Figure 1. Each block represents a ten-second interval. In each line there were thirty blocks which make up five minutes of observation time. In the top row of blocks all adult initiation and commands are recorded. In the second row the S response to commands. Above the adult row the observer noted what activity S_A was involved in. As each ten second went by the observer would record in the appropriate block on her data sheet, if S_A was making any of the selected responses.

Results

As shown in Figure 2 during the baseline condition duration in activities was short. Data taken during day one through day six showed a range of thirty to sixty-three seconds per activity with an average duration of forty-six seconds per activity.

From day seven through day eleven the S was to be reinforced for being in activities for thirty seconds or longer. The method of clicking the cricket did not seem to be appropriate. The mean duration in activity was forty-six seconds per activity. This condition appeared not to

be any different than the baseline condition. Duration ranged from eighty-two to thirty-one seconds per activity.

As shown in Figure 2 from day twelve through day twenty the S_A's duration increased when the visual cue for signalling the teacher was used. The mean duration in activity was ninety-one seconds per activity with a range of thirty-nine to two hundred ninety three seconds (approximately five minutes). His duration doubled when the teacher attention was contingent upon his behavior.

Reliability

The first day of reliability was a training session for the second observer. On day seven the reliability score was ninety-four percent on activities and ninety-six percent on the interaction between the S and the teacher.

Discussion

There was an increase in duration of S_A's activities once the teacher was alerted effectively. Duration in activity was extremely variable. This was in part due the variation of activities available. The necessity of reinforcing the subject as soon as he reaches criteria can not be overstressed. Contingency of the behavior and the reinforcers was the key to behavior modification. The physical problem that one classroom presented was also seen here. The auditory stimulus had been appropriate in another nursery school situation but was not in this one.

S_B was a four and a half year old Negro girl who attended Head Start. The Head Start Center was in a predominantly Negro area of a city. The S was an extremely quiet girl. Her play was limited to extremely passive play by herself. If children asked to play with or began to assert themselves she would leave the area. She was reluctant to talk to both adults and peers. She refused to do many tasks that the teacher asked her to do, because of these refusals she was placed in the group of slow learners.

The teacher had chosen S_B to be the child that they work with because of her low peer interaction. Data taken during the beginning of the year with S_B showed that her rate of peer interaction was less than ten percent. The observer was to cue on this behavior.

Symbols and Categories

/ = Nonverbal initiation by S
X = Completed nonverbal initiation by S
0 = Initiation by others
Ø = Initiation by others - responded to by S nonverbally
√ = Verbal initiation by S
✓ = Completed verbal initiation by S
/ = Initiation by others - verbally responded to by S

Activity was also recorded for this subject. It was recorded using the same guideline as for S_A

Observation procedures were the same for S_A. The Observation Form was also the same. Peer interaction was recorded on the top row of boxes and adult interaction was recorded on the bottom row with activities recorded above the first row.

Design

On day one the observer began her recording of S_B's behaviors. The first five days were to be baseline without the teacher changing her behavior toward the subject. The observation was ended on day six.

Results

During the six days of observation S_B went from a low of zero percent of peer interaction on day one to a high of sixty percent of her time in peer interaction on day five. Mean percentage of S_B's peer interaction was thirty-one. The SIO data collected on S_B prior to the intervention program showed a mean nine point five percent of peer interaction as shown in Figure 3.

The observation was ended on day six because of the high percentage of peer interaction. The data collected on activities showed a high mean duration of activities throughout the study. Neither behavior was appropriate for manipulation.

There was a very definite increase in S_B's peer interaction during the baseline condition. The SIO data had been collected over several months and it showed a low level of peer interaction far below the mean of the six days of the study. In a conference with the teachers during the observation the teachers mentioned that they had been suggesting to children that they should play with S_B. They had been very supportive of her. They had also placed her in a slow, small group so that she was the top child in the group. They stated that she was now talking in the group and answering the simple questions that they were asking.

During the post SIO observation S_B had a mean of thirty-nine percent peer interactions. Her rate of peer interactions maintained itself throughout the remainder of the year.

Discussion

Though there was no prescribed manipulation by the intervention coordinator, there was a manipulation that the teachers decided upon. Though the change in their behavior can not be documented by data, only by their statement and the observers judgement. The change did remain throughout the year with her peer interaction being four times as high in the post data than it was in the pre.

A Negro girl was our third subject. She attended Head Start in a predominantly Negro section of a city. She was described as being very quiet and retiring. She played by herself using equipment that was made for one person to play with. $\underline{S}_C$ seldom spoke to either adults or peers. The teachers described her as also having difficulty in preacademic skill. She would often spend long periods of time setting and trying to put back a simple puzzle. Often she sat and watched other children play from a distance.

At a teacher's meeting they discussed this subject. They felt that it was important to help this child since she would be going into kindergarten next year.

Symbols and Categories

/ = Initiation by $\underline{S}$ nonverbally
X = Initiation by $\underline{S}$ completed by adult or peer
0 = Initiation by either peer or adult to $\underline{S}$
Ø = Initiation by either peer or adult to $\underline{S}$, completed by $\underline{S}$ nonverbally
✓ = Verbal initiation by $\underline{S}$
✓X = Verbal initiation by $\underline{S}$ completed by peer or adult
✓Ø = Initiation by others, completed verbally by $\underline{S}$

A two line observation form was used. The observation was done as in the previous studies. On the top line peer interaction was recorded and on the bottom column adult interaction was recorded.

Reliability data was collected on days six and seven. Two observers (observer #1 and observer #2) recorded $\underline{S}_C$'s behaviors using the categories listed above. No training day was needed since the reliability observer was familiar with this code.

Design

From day one through four baseline data was collected. The teachers were instructed not to do anything special with $\underline{S}_C$. On day four a conference was held with the teachers to make a decision on what to do with $\underline{S}_C$.

On day five the teachers were instructed to "prime" others to play with $\underline{S}_C$. Priming consisted of the teacher suggesting and/or giving a piece of equipment to the child so to predispose him to play with the $\underline{S}$. When the $\underline{S}$ was involved in peer interaction they were to attend to $\underline{S}_C$ and peers.

A second conference was held with the teachers after day eight. The procedure for working with $\underline{S}_C$ was discussed.

Results

In Figure 4 it can be seen that there was no change in $\underline{S}_C$'s behavior when the condition was to be changed. $\underline{S}_C$ spent a mean of three percent

of his time interacting with peers during the baseline and a mean of four-percent during the experimental condition.

The teachers asked that the study be stopped. They stated that there was no need for the study to be extended. They would prime one of the children and when that failed they would not attempt again. They stated that none of the children wanted to play with her and they should not be forced to.

The reliability checks on days six and seven showed an inter-observer reliability of ninety-three percent and ninety-five percent respectively.

The Post SIO data showed that $\underline{S}_C$ peer interaction remained at low level. $\underline{S}_C$'s peer interaction was eight percent which was slightly higher than her percentage during intervention.

The subject of this study was a four-year-old Negro boy. The boy who will be referred to as S_D was enrolled in a Head Start class in Kansas City, Kansas. The class was almost entirely Negro, as was the staff. The head teacher was the only male on the staff, though the class membership was more balanced in sexual distribution, with slightly more girls in regular attendance.

The teaching staff pointed out S_D as being almost entirely incommunicative. S_D also proved untestable on standard instruments when he consistently did not make appropriate responses, especially verbal. S_D was reported compliant to teacher directions, with the qualification that nonverbal responses were hesitant, and verbal responses were nonexistant. S's mother had reported he suffered no speech problems at home. In the Head Start class, however, S_D had been heard to speak only twice, both times to the male head teacher, and both times asking permission to go to the restroom. It was decided that higher rates of both peer and adult interaction, especially verbal, would be the desired improvement in S_D's classroom behavior. Social reinforcement and priming by the staff members were chosen as the means to encourage the boy's interactions.

Design

A single observer daily watched and recorded S_D's behavior for varying amounts of time, up to forty minutes, of free play. During these largely unstructured play sessions, the observer followed S_D's activity, maintaining a workable proximity without intervening; no attempt at observer-subject interaction was made.

A ten-second observing interval was used, with data recorded by code symbols. The observation form (Fig. 5) of three lines, each divided into blocks representing ten seconds, enabled the observer to record type, duration and persons involved in any interactions with S_D. Peer and adult initiations and interactions with S_D were recorded on two separate lines, while the third was used to mark time spent by S_D in proximity or parallel play with peers. Discussion of S_D's activities was supplemented by a daily commentary kept by the observer.

To collect data from structured situations, to be used for comparison, short periods of small groups, including S_D, being taught by the male head teacher were observed. This observation was largely informal and somewhat sporadic. The data thus collected was simplified mathematically to form the content of summary and comparative graphs and the basis of some general conclusions.

Symbols and Categories

P = Proximity - being within three feet of another peer, but not interacting with any peer or envolved in parallel play.

+ = Parallel play - following other children, playing with similar objects and following the movements of the other child - such as playing with cars on the floor or building with blocks, but in

which there is no social interaction as defined by SIO. They could be building on the same structure, but are not talking or handing objects to each other.

Social Interaction

/ = Subject initiated to either a peer or adult nonverbally. No responses.
X = S initiated nonverbally - respond to.
✓ = S initiated verbally - no responses.
✓̸ = S initiated verbally - responsed to.
0 = Peer or adult initiated to S - no responses.
Ø = Peer or adult initiated to S - responsed to nonverbally.
Ø̸ = Peer or adult initiated to S - responsed to verbally.

Structured Time Observation

1 = any time S or group was called upon by teacher (A) for an answer or action.
+ = any time S responded to being called upon, mark (above) was crossed to so indicate.
! = any time S emitted any spontaneous verbalizations; always individual.

Those symbols were recorded in categories, on the backs of dated record sheets or classroom observation.

group	individual
1 or +	1, +, or !

During the first five days the teachers were told not to change their behavior toward the S. On day five a meeting was held with the teachers at which a decision was made to reinforce all verbalizations and peer interactions. On day thirteen teachers began not only to reinforce but prime the subject for peer interaction and verbalization. This was also extended to group time not just free play.

Results

The first five days of observation of S_D, before any special attention was given him, established his observed rate of verbal interaction, with both peers and adults at two percent of the observed intervals (Fig. 6). After a conference with the teachers in which social reinforcement of the S's interactions in free play was introduced S_D interacted verbally six percent of the time. After the introduction of "priming" with social reinforcement at day 13 S_D's rate of verbalization increased to eleven percent.

S_D's initiation to both peers and adult during the first five days was three percent (Fig. 7). From day six through thirteen this initiation increased to fifteen percent. S_D's initiation again increased to twenty-two percent during the last seventeen days. Initiation included both verbal and nonverbal.

The SIO data which was collected prior to and after the intervention showed increases in both S_D's verbalization and peer interaction. In the pre SIO data S_D had a mean of two percent verbal interaction. During the post verbal interaction increased to twenty-four percent. S_D's peer interaction was thirteen percent during the pre SIO. The post SIO data showed S_D interacting with his peers forty-six percent of the time.

Much of the measurable interaction and social reinforcement, of S_D and A, the male head teacher, took place in the structured class time. The data gained from twelve observations of these small-group sessions can be usefully compared with the data from observing S_D in play. During structured class time A, the main reinforcer, called on S_D at an average rate of 1.34 per minute. S_D responded appropriately to fifty-four percent of these initiations. S_D responded to forty-eight percent of the adult initiations during free play, yet the average rate of initiation to S_D by the total adult staff was only .52 per minute of play time. Another important comparison was the rate of S_D spontaneous initiations to the male adult A, in class time as compared to the S's initiation to all adults during free play. S_D initiated to A, in class time an average of .54 per minute, but his rate of initiative to the entire staff during free play was only .09 per minute.

Discussion

Both verbalization and the S's initiation during free play increased when behavior modification procedures were applied. When only reinforcement was used there was an increase, but the addition of priming and the extension of these procedures into class time produced an even greater increase. It was unfortunate that class data was not collected for all of the study. Ten of the class observation occurred during the last portion of the study. It would have been beneficial to see if there was a change in S_D's behavior during class time.

Both from casual observation and data that was collected it appeared that priming and reinforcement were more contingently and effectively applied during class time. The structured situation of class time was more conducive for priming. Also the teacher was always in close proximity to the S so that he could easily and immediately praise S_D for responding verbally. During free play the teacher was often not close enough to know when the subject had verbalized and/or able to give contingent reinforcement for verbalization. For this reason it would have been better to have started using both priming and reinforcement in the class situation and then extend them to the free play situation after the teachers had become accustomed to using them.

The subject of our fifth study was a Negro four-year-old boy. He had been described as being nonverbal. Seldom did he talk to either adults or peers. He appeared to have no articulation difficulties. When he did speak he was easily understood. His peer interaction was also low since he would seldom initiate play verbally. Often when the teacher asked him a question the child would not answer but would point or nod.

The teachers were concerned about his lack of verbalization. They felt that at his age it was important for him to be talking. They were not concerned with the peer interaction.

The SIO observation procedure and forms were used (Fig. 8). The SIO observation code was changed. When a chain was recorded a "V" was placed above the interval in which S_E verbalized. This was to compensate for the fact that a chain could be on a verbal level without S_E ever verbalizing. To give accurate data on his verbalization this procedure was used.

Design

A baseline was collected from the SIO data taken previously. Since the "V" had not been used above the verbal chain, all verbal chains were considered verbalization on the subject's part. This data was recorded on sessions A through F.

From day one through day thirteen teachers reinforced the subject for his verbalization. They reinforced him by attending, going to him and/or giving him something.

Results

During the pre SIO observation subject averaged eight percent of his verbalization ranging from four percent to fifteen percent (Fig. 9). The data was shown in twelve minute segments.

During reinforcement S_E's mean percentage of verbalization increased to thirty-one. Ranging from a low of eleven percent on day one to a high of sixty-two percent on day twelve.

The post SIO observation showed a mean of twenty-two percent verbalization. This was a decrease from the mean during reinforcement, but this was an increase over the pre SIO.

Our next subject was also a child with a verbal problem. He was a three and a half year old caucasian boy. His mother was deaf so no verbal training had been carried out in the home. The subject was described as primarily a babbler. He had limited number of words. Many of these were incorrectly articulated. $\underline{S}_F$ spoke in sentences but they were unintelligible. He was an extremely responsive child and enjoyed playing with his peers nonverbally. He would call for attention from adults to what he was doing by shouting repeatedly "hey" or "hi".

A meeting was held with the teachers. They decided that it was important to increase and improve this child's verbal behavior. To increase the number of words and improve his pronunciation of them was also our goal.

Symbols and Categories

√ = Verbal initiation to either a peer or adult by this S
√̸ = Verbal initiation by S that was completed
0 = Initiation by either a peer or adult
Ø = a verbal response to an initiation
S = Verbalizing to self
I = Intelligible word within that ten second interval (the observer recognizes).

Above the line is placed the I if intelligible and a number which indicates the number of intelligible words. The words that are intelligible were recorded unless they were one of the frequently intelligible words, such as, "hi".

A two row observation sheet was used. On the top row peer interaction was recorded. The bottom row was used for recording adult interaction. The observation technique was the same as described with $\underline{S}_A$.

Design

From day one through seven observation was carried out with instruction to do nothing special with the subject. Data was collected in the same manner as the previous studies.

From day eight through day twenty-eight the teachers were instructed to reinforce $\underline{S}_F$ for verbalization be attending to him. They were to encourage him to talk and reinforce him whether it was intelligible or not. This was to increase his vocalizations. As the subject's rate of verbalization increased they were to be more selective of the words to reinforce. The teachers were given a list of sounds that were usually correctly articulated at this age. They would select equipment and pictures that would be easy for him to pronounce. This was a type of "priming". At day twenty-two an emphasis was placed on intelligible words. When the child correctly articulated the child was praised.

Reliability

Reliability data was collected on three days, day fifteen, sixteen and seventeen. The first day was a training day. The two observers used the same code and observation procedure. During the training session the observers would stop and talk about their recording. On the other two days nothing was said except to start the observation and end it.

Results

From day one through day seven baseline data was collected. In Figure 10 it was seen that S spent fourteen percent of the session verbalizing with a range from three percent to thirty-five percent. Only during four percent of the session was his speech intelligible.

On day eight the reinforcement of verbalization began. During reinforcement the percentage of vocalization increased to thirty-three percent ranging from eleven percent to fifty-four percent. Eight percent of his intervals had intelligible words. The last seven days were above the eight percent mean.

A list of all words correctly pronounced by the subject was compiled. The subject had a basic vocabulary of approximately twenty words during our baseline condition. These words included "Hi", "Hey", "No", "Me", "looking", and "don't", etc. At the end of the study the observers had recorded over one hundred words that were intelligible. These words included colors, numbers and some phrases.

Reliability

The reliability on the training day was not recorded. Day sixteen the reliability observers had difficulty in getting at a distance at which they both could hear. On day seventeen the reliability scores were eighty-nine percent on adult and peer interaction and eighty-two percent on intelligibility.

Discussion

This study had three purposes first to increase the subject's verbalization, second to improve the articulation and thirdly to increase the subject's vocabulary. There was an obvious increase in the subject's verbalization from fourteen-percent to thirty-three percent. The percent of correctly articulated words also increased but the percent of intelligible words began to increase when they specifically began to work with correct articulation. The third aspect, vocabulary, also showed an enlarging during the experimental phase, though due to lack of time nothing was done systematically to increase it.

A caucasian red headed little girl was our last subject. She had been described as liking to be with teachers. She seldom interacted with her peers but would find a teacher to sit with and talk to. She would turn down advances made by peers so to be with a teacher. They also described her as being nonverbal with her peers.

The teachers felt that she should be interacting with her peers. At a teacher's meeting they discussed the S and decided that they should try to increase her peer interaction and decrease her adult interaction.

Data was collected on S_G's behavior using the SIO data form and procedure. The decision for using the SIO was so that we could compare the pre data collected on her with the data collected during the intervention procedure. The form of observation was the same as for Subject A.

Design

A category of particular interest was adult intervention. Adult intervention is behavior emitted by adults which intervenes into ongoing subject to peer, subject to adult or subject to group. Of particular interest in this study was adult intervention when S_G was interacting with peers and the adult was commenting on ongoing play.

Pre data was collected on S_G for several months prior to the intervention phase. Twenty-four three-minute observations had been taken during these months.

Day one through day nine represents a manipulation period in which the teachers would decrease the amount of time that they spent with the S. Also they were to reinforce her when she was interacting with peers. This was done by the teachers going to her, talking to her and/or giving her a piece of equipment.

A post check was made several weeks after the completion of the study. This was done to determine if the teachers still maintained their systematic approach with the child.

Reliability

A reliability check was made once during the study. On day six two observers (main #10 and reliability #22 checker) observed S_G for all the free play time. They observed separately and then recorded their agreements. Reliability was calculated the same as the SIO reliability was calculated. Both reliability for total blocks and reliability on total responses were calculated.

Data on adult intervention was recorded by the rate per eighteen minutes. The pre data was recorded in blocks of eighteen minutes on six observations. Since adult intervention is such a small number that the change would be difficult to ascertain if using percentage.

Results

During the pre data collection $\underline{S_G}$ had a mean of thirty-three percent adult interaction (as shown in Figure 11, A-D). Her peer interaction averaged eight percent, adult. No adult interventions were recorded.

From sessions one through nine in which the teachers were attempting to decrease $\underline{S_G}$ teacher interaction and increase peer interaction (Fig. 11). The mean percentage of adult interaction decreased to twenty-four while the mean percentage of peer interaction increased to twenty. Adult intervention increased to two point three per eighteen minutes of observation. On day three peer interaction was to a high of forty-six percent and the adult intervention was at a high of six point seventy-five per eighteen minutes. Three of the last four days $\underline{S_G}$ had higher peer interaction than adult interaction. Only one day during the pre did the peer interaction exceed the adult interaction.

In the post check which was taken three weeks after the day nine $\underline{S_G}$ had twenty-eight percent adult interactions and nineteen percent peer interactions. This was a slight increase in adult interaction and very slight decrease in peer interactions. Adult intervention had also decreased to point seventy-five.

The reliability percentages were ninety-one on total blocks and seventy-eight on total responses. Reliability of eighty percent total blocks and sixty percent total blocks was acceptable.

Post SIO data which was collected on this subject showed her with a mean peer interaction of twenty-eight percent which was both an increase over the manipulation and pre data. The adult interaction decreased to seventeen percent during the post collection of the SIO data.

Discussion

This study dealt with two behaviors simultaneously--teacher and peer interaction. By decreasing teacher interaction, peer interaction may by itself increase. To make for a stronger study the teacher not only discouraged teacher interaction, but also reinforced interactions with peers. The teachers were very effective decreasing adult interaction for the highest day and lowest day were the first and last day of the study, respectively. The effect was not as dramatic for the peer interaction.

The post check taken several days after the manipulation showed a slight decrease in peer interaction and increase in adult interaction. The teachers had began to slip in their behavior toward the subject. The data collected on the post SIO indicates that they did maintain the behavior used in the manipulation to decrease adult interactions and increase peer. During this check, peer interaction was higher than adult interaction.

Conclusion

Behavior modification can be effectively applied in the Head Start classrooms as demonstrated by the six successful studies. The teachers were able to increase verbal behavior, peer interaction and duration in activities by applying simple procedures. These simple procedures included "priming" and "social reinforcement". This increase in verbal behaviors and peer interaction appeared to have maintained throughout the year as seen in the post SIO.

One study was not successful and various difficulties were encountered with other studies. With some teachers it was essential to almost daily remind them of the study. The teachers' cooperation with the study was determined by them. Several times there were resistances to our being there and the heavier workload that was asked. Except in cases where the teachers saw immediate change it was difficult to keep them following the procedures that were outlined. The need for a reinforcer for the teachers for thorough supervision of the study and immediate acknowledgement of an appropriate response by the teacher was quite obvious.

Each classroom presented its own problem. Flexibility in design was needed to adjust to each of these problems. The classroom size varied from a very small room with twelve children and three or four adults to a room the size of an auditorium with thirty children and four or five adults. Each class determined whether all the teachers be responsible or one teacher be responsible for the study. Two classes chose to have one teacher to be primarily responsible for the study. Both of these designs were equally effective.

The teachers did not have to spend any more additional time with the children than they had previous to the study. As in the case of $\underline{S_G}$ the amount of time spent with one subject decreased from the pre SIO data. The time with a specific child doesn't have to increase though the teacher must always be aware of the child. In some case it would be to the subject advantage if the teacher would increase their contact with the subject. Several children had a very limited contact with teachers during observation of free play. An increase of teacher attention would had been more beneficial than remaining at the same level. $\underline{S_G}$ was an example of a child who benefited from a decrease in adult interaction.

Teachers were trained to use behavior modification principle effectively. All teachers in the program had at least one successful study using behavior modification. This study has pointed out some of the difficulties encountered in training, but at the same time has found ways to adapt this procedure to different classrooms and teaching situations. The purpose of this study was not only to show that behavior modification procedures can be effective, but that training of Head Start teachers could be accomplished successfully as demonstrated by their use of the procedures.

SIO data was collected pre and post in all classes. Two classes also had mid data collected. The pre observation began in October and post observation began in April for most classes. All children who received at least twenty-one minutes of observation were part of the sample. Children who had less than twenty-one minutes were considered to have partial data and this data was not included in the report. Since the subjects had data ranging from twenty-one minutes on, all data was given in the percentage of time. This was computed by taking number of incidence of a behavior over the number of ten-second intervals observed. Formula was:

$$\frac{\text{\# of incidence of behavior}}{\text{\# of intervals observed}} \times 100 = \text{Percent of Behavior}$$

Only a few behaviors have been selected for this report. A more elaborate report of the SIO data will follow. The last three tables of this section were comparisons of the experimental behavior modification and control classes (which includes the one pre-academic class) pre and post.

Figure 1

SAMPLE OF RECORDING FORM

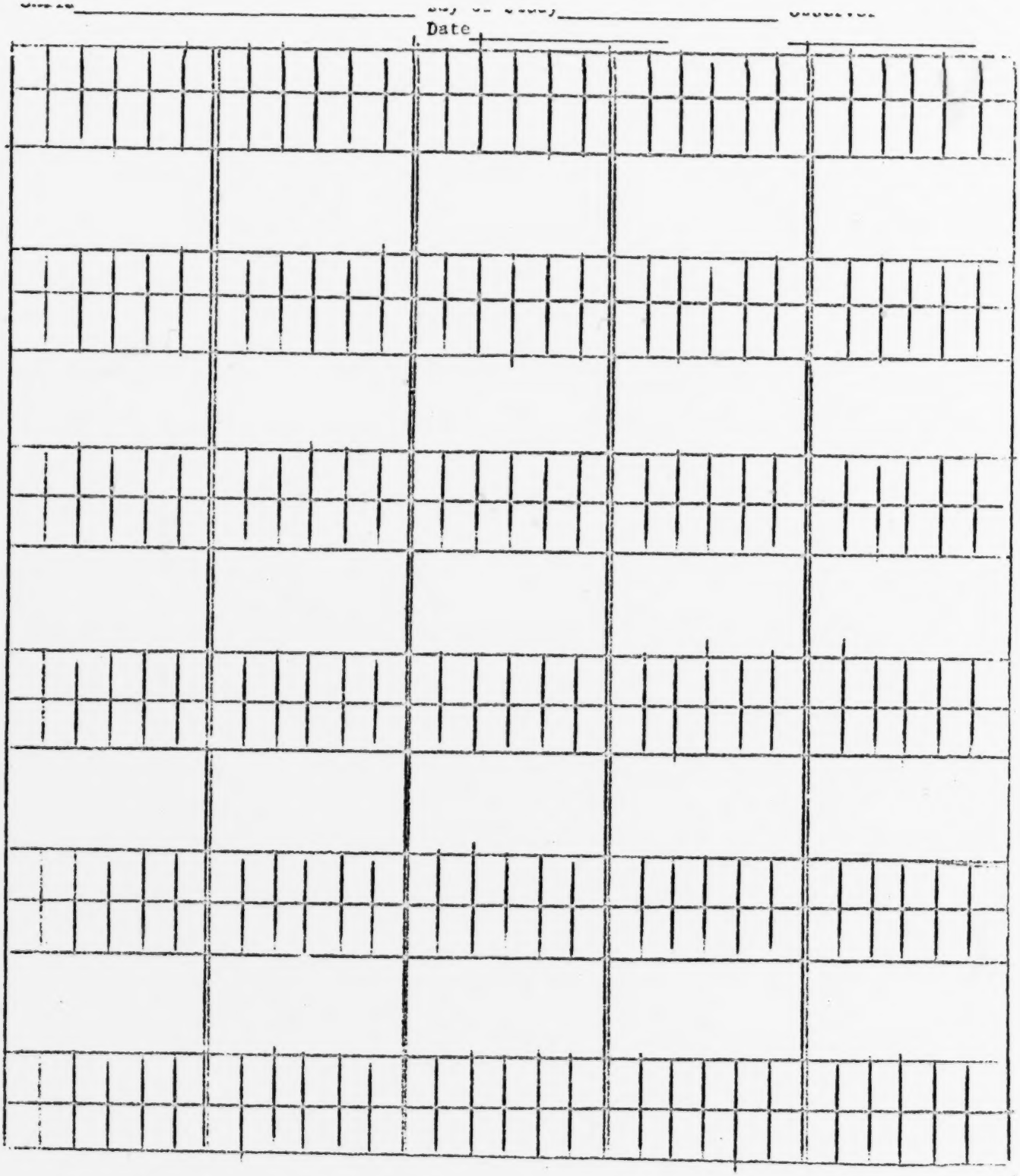

Figure 1. Sample of Recording Form.

Figure 2

MEAN SECONDS OF DURATION IN ACTIVITIES

$\underline{S}_A$

Figure 2. Mean Seconds of Duration in Activities S_A

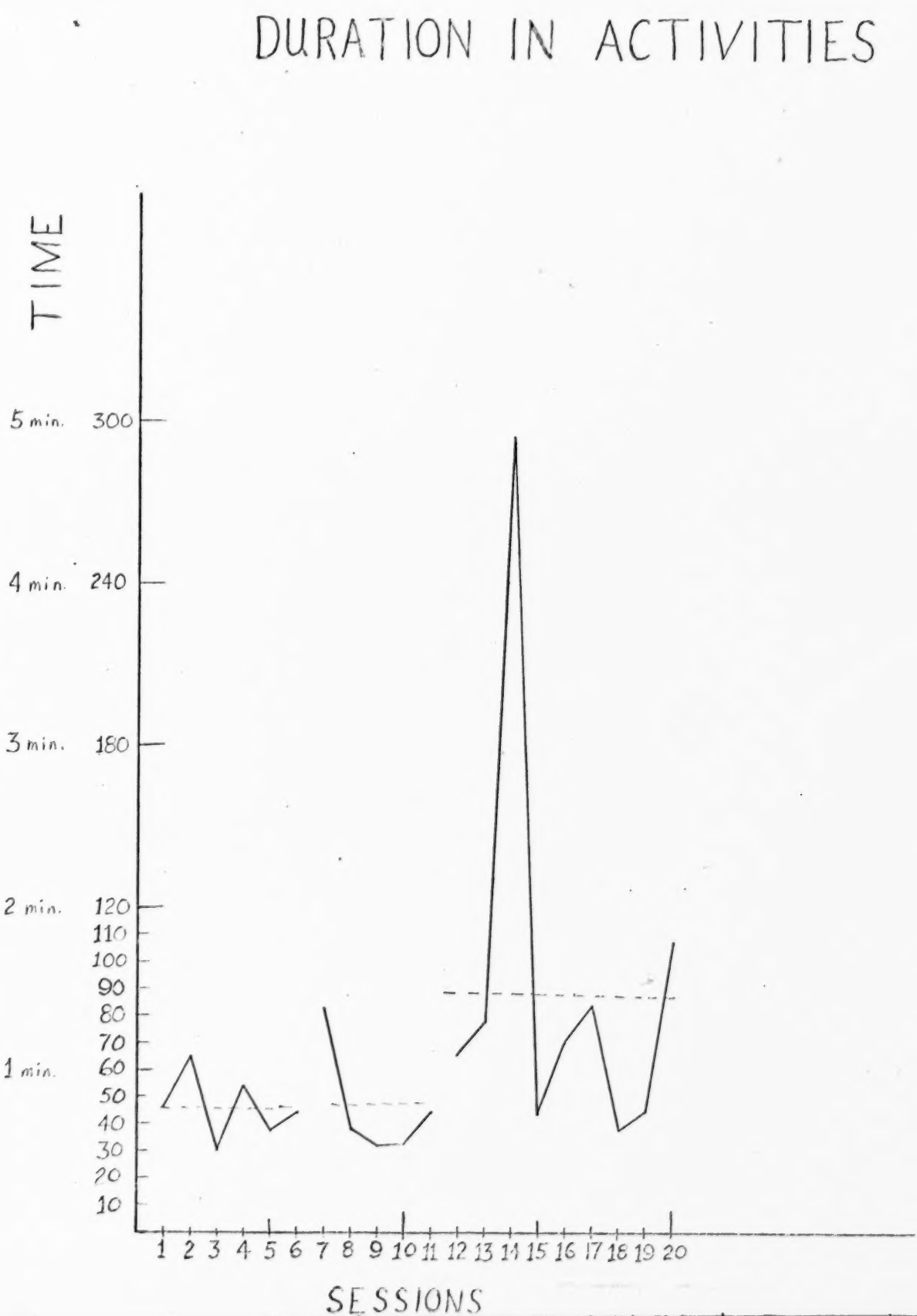

Figure 3

PERCENT OF $\underline{S}_B$'S PEER INTERACTION

Figure 3. Percent of S_B's Peer Interaction.

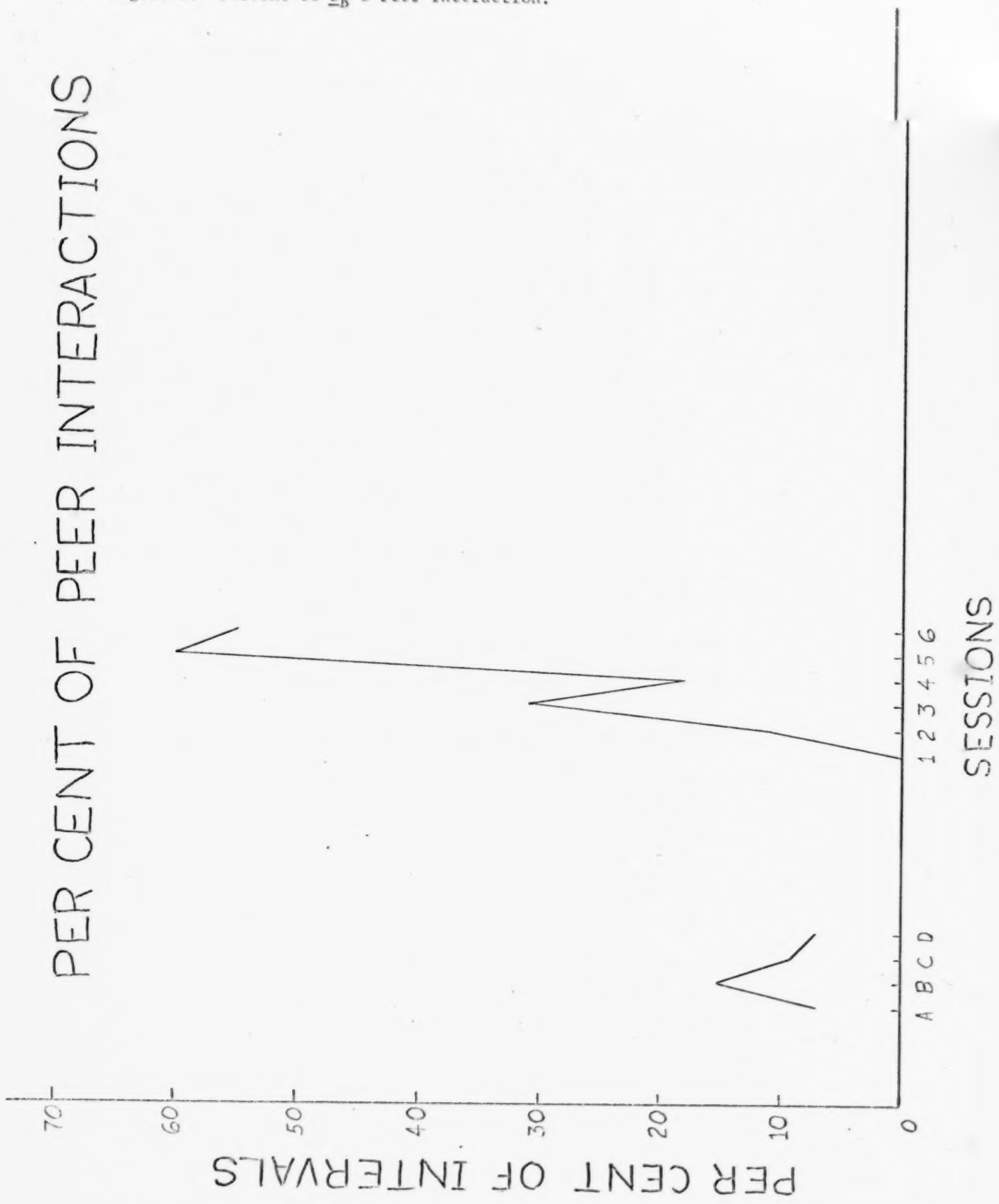

Figure 4

PERCENT OF $\underline{S}_C$'S PEER INTERACTION

Figure 4. Percent of S_C's Peer Interaction.

Figure 5

SAMPLE OF RECORDING FORM

Child_____ Day of Study_____ Observer
Date_____ _____

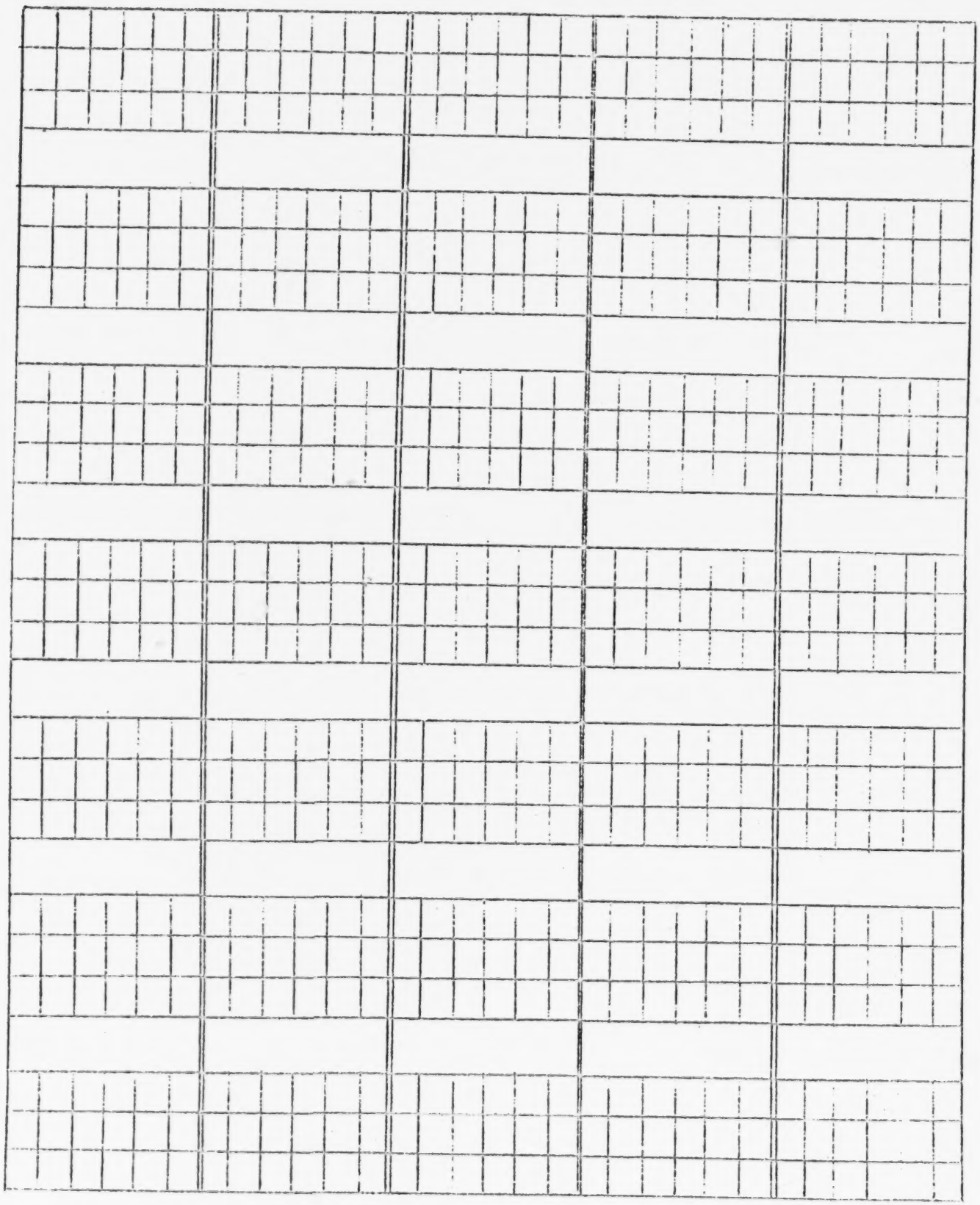

Figure 5. Sample of Recording Form.

Figure 6

PERCENT OF S_D'S VERBALIZATIONS

Figure 6. Percent of S_D's verbalizations.

Figure 7

PERCENT OF $\underline{S}_D$'S INITIATIONS

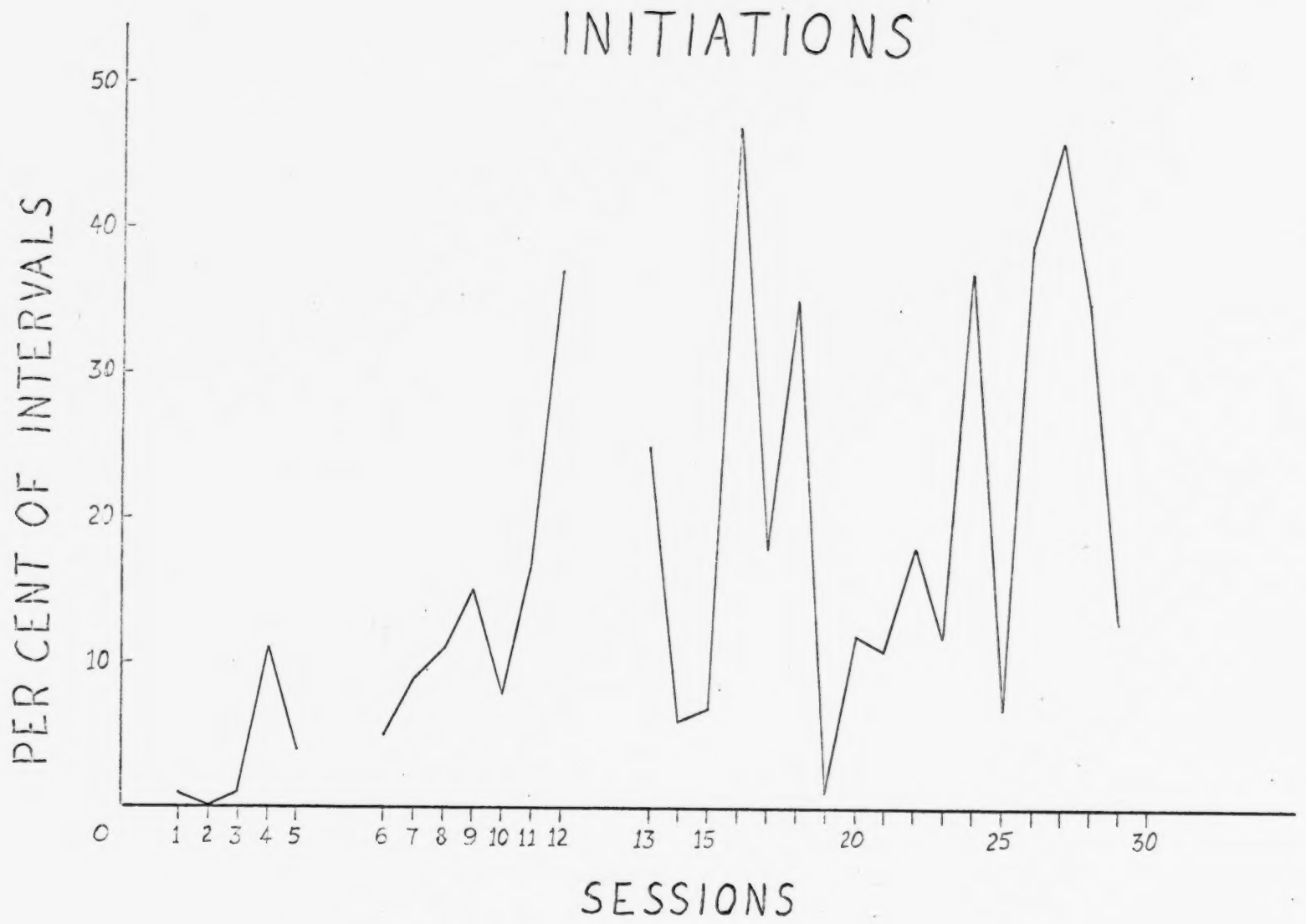

Figure 7. Percent of S_D's initiations.

Figure 8

SAMPLE OF SIO RECORDING FORM

UNIVERSITY OF KANSAS HEAD START RESEARCH AND EVALUATION CENTER
Department of Human Development

SOCIAL INTERACTION OBSERVATION FORM

E. and R.	Center	Class	Obser.	Date	Session	Week of Center Operation
					AM PM	

	Minute 1	Minute 2	Minute 3

Child No.	Letter	Time	Activity

V

N

Child No.	Letter	Time	Activity

V

N

Child No.	Letter	Time	Activity

V

N

Child No.	Letter	Time	Activity

V

N

A_1 _____ A_6 _____ A_{11} _____
A_2 _____ A_7 _____ A_{12} _____
A_3 _____ A_8 _____ A_X _____
A_4 _____ A_9 _____ A_X _____
A_5 _____ A_{10} _____ A_X _____

Developed under contract with the Office of Economic Opportunity Head Start Research and Evaluation

Figure 9

PERCENT OF S_E'S VERBALIZATIONS

Figure 9. Percent of S_E's verbalizations.

Figure 10

PERCENT OF S_E'S VERBALIZATION AND INTELLIGIBLE VERBALIZATIONS

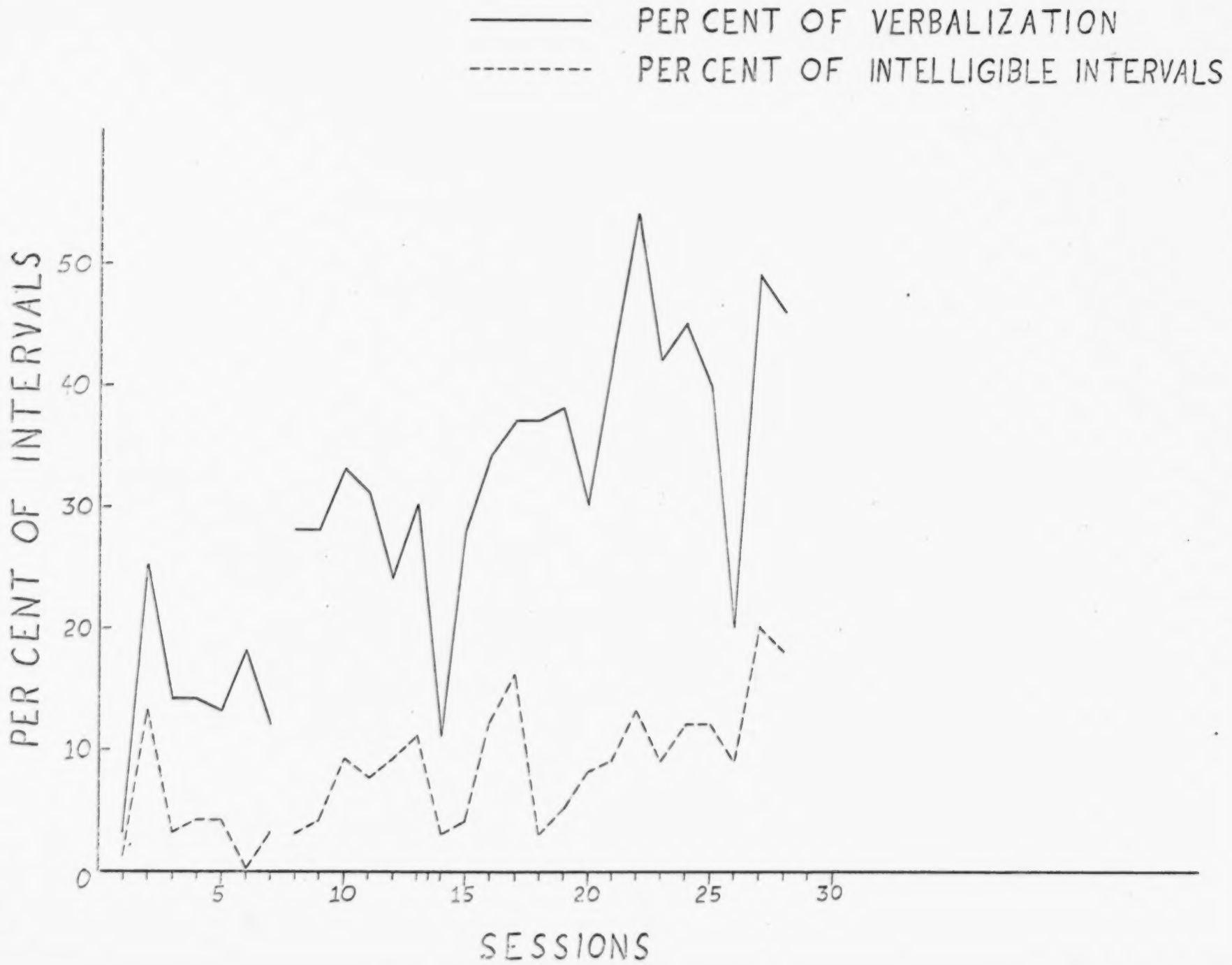

Figure 10. Percent of $\overline{S}_E$'s verbalization and intelligible verbalizations.

Figure 11

PERCENT OF S_G'S ADULT AND PEER INTERACTION

PER CENT OF ADULT INTERACTION
PER CENT OF PEER INTERACTION
PEER
ADULT
POST SIO
POST CHECK
SESSIONS
0 A B C D 1 2 3 4 5 6 7 8 9
10 20 30 40 50 60
PER CENT OF INTERVALS

Figure 11. Percent of $\underline{S}_G$'s adult and peer interaction.

Table 2

SIO

Mean % of Verbal, Nonverbal, Verbal and Nonverbal, and Minus Interactions by Class Sample Pretest

Class	% of Interaction	% Verbal	% Nonverbal	% Verbal & Nonverbal	% Minus Behaviors
01-1	26.7	15.9	3.0	7.8	.2
01-2	29.0	16.8	2.9	9.3	.2
02-1	22.1	5.8	10.5	5.8	.1
02-2	34.3	9.8	11.5	13.0	.0
03-1	37.9	12.1	12.1	13.7	.5
03-2	37.7	13.3	11.4	13.0	.1
04-1	25.6	14.6	5.4	5.6	.1
04-2	27.9	17.6	5.1	5.2	.2
05-1	38.3	16.8	7.8	13.7	.7
06-1	37.2	33.1	1.0	3.1	.1
07-1	34.7	28.2	1.8	4.7	.4
Mean %	31.9	16.7	6.5	8.6	.2

Table 3

SIO

Mean % of Verbal, Nonverbal, Verbal and Nonverbal and Minus Interaction by Class Sample Posttest.

Class	% Completed Interaction	% Verbal	% Nonverbal	% Verbal & Nonverbal	% Minus Behaviors
01-1	28.7	22.3	1.4	5.1	.2
01-2	26.8	17.6	1.6	7.6	.5
02-1	22.5	8.6	8.1	5.8	.1
02-2	33.2	15.1	9.4	8.7	.1
03-1	44.9	23.1	7.2	14.6	.3
03-2	30.6	17.8	4.7	8.1	.1
04-1	38.2	24.0	8.4	5.8	.3
04-2	28.0	18.4	5.9	3.7	.3
05-1	42.6	21.2	7.1	14.3	.7
06-1	31.0	25.1	1.6	4.3	.0
07-1	32.9	20.6	4.5	7.8	.2
Mean %	32.7	19.4	5.4	7.8	.3

Table 4

SIO

Mean % of Verbal Interaction Between Adults and Peers in Pretest.

Class	% Interactions Adult	% Interactions Peers
01-1	7.3	8.6
01-2	11.4	5.4
02-1	2.6	3.2
02-2	3.8	6.0
03-1	1.6	10.5
03-2	1.1	12.2
04-1	1.8	12.8
04-2	2.6	15.0
05-1	5.7	11.1
06-1	9.0	24.1
07-1	15.0	13.2
Mean %	5.5	11.6

Table 5

SIO

Percent of Verbal Interactions with Adults and Peers, Posttest.

Class	% Interaction Adult	% Interaction Peers
01-1	9.8	18.9
01-2	16.2	10.6
02-1	6.4	16.1
02-2	8.9	24.3
03-1	8.0	36.9
03-2	6.8	23.8
04-1	3.7	20.3
04-2	3.1	15.3
05-1	14.7	27.9
06-1	5.5	19.6
07-1	4.8	15.8
Mean %	8.0	20.9

Table 6

SIO

Mean Percent of Completed Interactions Between Subject and Adult and Peers, Pretest.

Class	% Interaction Adult	% Interaction Peers
01-1	12.4	14.3
01-2	19.4	9.6
02-1	6.3	15.8
02-2	9.7	19.6
03-1	4.5	33.4
03-2	3.4	34.3
04-1	2.9	22.7
04-2	4.2	23.7
05-1	15.4	22.9
06-1	10.7	26.5
07-1	17.7	17.0
Mean %	9.7	21.8

Table 7

SIO

Mean % of Completed Interaction between Subject and Adults and Peer, Postest.

Class	% Interaction Adult	% Interaction Peers
01-1	9.8	18.9
01-2	16.2	10.6
02-1	6.4	16.1
02-2	8.9	24.3
03-1	8.0	36.9
03-2	6.8	23.8
04-1	5.0	33.2
04-2	4.0	24.0
05-1	14.7	27.9
06-1	7.7	23.3
07-1	10.6	22.3
Mean %	8.9	23.2

Table 8

SIO

Mean Percents of Verbal, Nonverbal and Minus Interactions by Class Sample Mid.

Class	% of Interaction	% Verbal	% Nonverbal	% Verbal & Nonverbal	% Minus Behaviors
06-1	31.1	26.9	1.2	3.0	.0
07-1	37.9	25.2	3.4	9.3	.4

Table 9

SIO

Mean Percent of Verbal Interaction Between Adults and Peers in Midtest.

Class	% Verbal Interaction Adult	% Verbal Interaction Peer
06-1	4.5	22.4
07-1	9.0	16.2

Table 10

SIO

Mean Percent of Completed Interaction Between Subject and Adult and Peers, Mid.

Class	% Interaction Adults	% Interaction Peers
06-1	6.	25.0
07-1	14.5	23.4

Table 11

SIO

Mean Percent of Verbal Interactions for the Experimental and Control Classes, Pre and Post.

Classes	Pre	Post
Experimental	14.9	21.0
Control	18.9	17.6

Table 12

SIO

Mean Percent of Adult Interaction for the Experimental and Control Classes, Pre and Post.

Classes	Pre	Post
Experimental	9.7	10.1
Control	9.7	7.5

Table 13

SIO

Mean Percent of Peer Interaction for Experimental and Control Classes Pre and Post

Classes	Pre	Post
Experimental	22.9	25.2
Control	20.5	22.0

Discussion

Tables 11 through 13 showed the comparison of the experimental behavior modification and control classes. Three categories of behavior were selected for comparison, they were verbal behavior, adult completed interactions and peer completed interactions. The pre data showed that the control interactions were more verbal, but had a lower rate of peer interaction. Adult interactions were the same for both. In the post data observation the experimental classes had a higher mean percentage in all three behaviors. The experimental classes showed increases in all three behaviors, whereas, the control classes showed decreases in two and only a slight increase in peer interactions from pre to post.

The behavior modification program was not only designed to help the specific child, but also to make the teachers more aware of the children's social behavior and procedure to stimulate this growth. As far as the data has been analyzed it appeared that there was an effect in those classes in which behavior modification was introduced. Adult interaction did not decrease during the year in these groups, whereas, it decreased in the control group. Last year's comparison of SIO data for Head Start and middle class children showed the Head Start child lower in adult interaction that the middle class child. Last year's data also showed a decrease from pre to post in adult interaction for Head Start children. Though the experimental Head Start children in this year's sample were not at the same level as the middle class children, they did make very slight increases in adult interaction. Peer interaction did increase for both groups. It was noted in last year's analysis that Head Start children had a higher rate of peer interaction than the middle class sample. It has been suggested that in Head Start the emphasis should be toward increasing adult interaction rather than peer interactions.

Social behavior, such as, verbal, interaction with both peers and adults did increase in classes where emphasis was placed on socialization of the child. The control group did not show these increases in social behavior. In these classes the children appeared to have only minimal gains and some decrease in social behavior from their experience in Head Start. The necessity for stress and concentrated effort in social development can not be overstated.

Teacher Observation

An observation of teachers was also used in this study. The SIO gave a description of the teachers behavior during the free play. This observation gave a description during structure situations. A structure situation was defined as any situation in which the teacher was in control of a specific group of children. The teacher was directing these children in a particular activity, such as a lesson, reading a story, or a singing group. The majority of observations were taken during lesson time with the teacher leading a small group.

A ten-second sampling method was used, the same as the SIO. Only one behavior was recorded that was positive reinforcement by the teacher.

Reinforcement was defined as comments such as, very good, what a nice job you have done, good boy, thank you, that is fine, I like the way you are doing . . . Positive reinforcement can also be nonverbal such as pats, hugs, smiling at the child, and/or giving him an object. Positive reinforcement could be recorded as verbal, nonverbal, or verbal and nonverbal simultaneously.

A two line observation sheet was used. In the top line verbal behavior was recorded and in the bottom line nonverbal behavior was recorded. When the teacher reinforced the child, a plus and the child's letter were recorded in the correct box.

A percent of positive reinforcement was computed. The percentage was determined by dividing the number of intervals in which reinforcement occurred by the number of intervals observed.

Table 14 showed the mean percent for each of the teachers observed. No pre and post data was collected on any teacher except one. The footnote on teacher number nineteen showed pre percentage, a percentage during a manipulation in which she was assisted in increasing her reinforcement, and a post percentage. This teacher was effectively assisted in increasing her positive reinforcement during lesson time. Even when assistance was withdrawn her percent of reinforcement still remained above the pre data though it did decrease from the manipulation.

Teacher observation presented many problems. Many of the teachers were inconsistent in having a structure activity or in participating in it themselves. Often the teacher would let the aides be in charge during the structure time so that they could take over administrative details. The observers who were collecting the SIO data were responsible for also observing the teacher. The teachers often schedule free play at a time most convenient for the observer, but it was difficult to schedule lesson time so that it would be convenient also. Due to these factors the quantity of data was much smaller than anticipated.

From the data collected no difference was seen between the teachers in the experimental behavior modification group and the teachers in the control classrooms. They both had a mean percentage of eighteen or approximately a fifth of their lesson time was spent in reinforcing the children.